

Application No. 09/665,767

RD-27100

Amendments to the Claims

Please cancel claims 31 and 34 to 36 without prejudice or disclaimer.

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims

1. (previously presented) A method for the determination of polymer molecular weight, comprising:

injecting a known volume of an analytical sample comprising a polymer reaction product of a diphenyl carbonate and a dihydric phenol into a flow analysis system comprising an on line flow path through (1) a chromatographic column, (2) a sequential concentration detector, and (3) a sequential waste reservoir, and an off-line split flow path from the concentration detector to a molar mass detector then to the waste reservoir;

effecting a minimally dispersive separation of the analytical sample with the chromatographic column to yield a first high molecular weight fraction in solvent;

determining a polymer concentration in the high molecular weight fraction in solvent using the concentration detector;

separating the high molecular weight fraction in solvent into a diverted high molecular weight fraction and a portion comprising solvent;

discharging the solvent portion directly and without further processing to the waste reservoir;

determining off-line the molar mass using the split flow path molar mass detector on the diverted high molecular weight fraction; and

deriving an average molecular weight from the polymer concentration and the molar mass.

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2. (canceled)

3. (canceled)

4. (original) The method of claim 1, wherein the polymer comprises an aromatic polycarbonate.

5. (previously presented) The method of claim 1, wherein the dihydric phenol is selected from the group consisting of 2,2-bis-(4-hydroxyphenyl)propane; hydroquinone; resorcinol; 2,2-bis-(4-hydroxyphenyl)pentane; 2,4'-dihydroxydiphenylmethane; bis-(2-hydroxyphenyl)methane; bis-(4-hydroxyphenyl)methane; bis-(4-hydroxy-5-nitrophenyl)methane; 1,1-bis-(4-hydroxyphenyl)ethane; 3,3-bis-(4-hydroxyphenyl)pentane; 2,2'-dihydroxydiphenyl; 2,6-dihydroxynaphthylene; bis-(4-hydroxyphenyl)sulfone; 2,2'-dihydroxydiphenylsulfone; 4,4'-dihydroxydiphenylether; 4,4'-dihydroxy-2,5-diethoxydiphenylether; and 1,1-bis(3-methyl-4-hydroxyphenyl)cyclohexane.

6. (canceled)

7. (original) The method of claim 6, wherein the suitable solvent is selected from the group consisting of benzene, toluene, xylene, chloroform, tetrahydrofuran, methylene chloride, trichloroethylene, dichloroethane, chlorobenzene, dichlorobenzene, trichlorobenzene, methyl acetate, ethyl acetate, hexafluoroisopropanol, and mixtures comprising at least one of the foregoing solvents.

8. (original) The method of claim 6, wherein the suitable solvent is selected from the group consisting of benzene, toluene, xylene, chloroform, tetrahydrofuran, dichloromethane, and mixtures comprising at least one of the foregoing.

9. (canceled)

10. (previously presented) The method of claim 9, wherein the minimally dispersive separation yields a high molecular weight fraction substantially free of monomers and polymerization catalysts.

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11. (original) The method of claim 1, wherein the chromatographic column comprises at least one size exclusion chromatographic column.

12. (original) The method of claim 1, wherein the minimally dispersive separation yields a high molecular weight fraction having a baseline peak width less than about 30 seconds at least one of the molar mass detector or the concentration detector.

13. (original) The method of claim 1, wherein the minimally dispersive separation yields a high molecular weight fraction having a baseline peak width less than about 20 seconds at least one of the molar mass detector or the concentration detector.

14. (original) The method of claim 1, wherein the minimally dispersive separation yields a high molecular weight fraction having a baseline peak width less than about 10 seconds at least one of the molar mass detector or the concentration detector.

15. (original) The method of claim 1, wherein the minimally dispersive separation yields a high molecular weight fraction having a peak width at half height less than about 10 seconds at least one of the molar mass detector or the concentration detector.

16. (original) The method of claim 1, wherein the minimally dispersive separation yields a high molecular weight fraction having a peak width at half height less than about 5 seconds at least one of the molar mass detector or the concentration detector.

17. (original) The method of claim 1, wherein the minimally dispersive separation yields a high molecular weight fraction having a peak width at half height less than about 3 seconds at least one of the molar mass detector or the concentration detector.

18. (original) The method of claim 1, wherein the concentration detector utilizes one or more detection methods selected from the group consisting of infrared absorption spectroscopy, ultraviolet absorption spectroscopy, differential refractive index detection, fluorescence detection, ultrasonic detection, and evaporative light scattering detection.

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19. (original) The method of claim 1, wherein the molar mass detector utilizes one or more detection methods selected from the group consisting of light scattering, low angle light scattering, multiangle light scattering, and viscometry.

20. (original) The method of claim 1, wherein the molar mass detector utilizes multiangle light scattering.

21. (original) The method of claim 1, wherein determining the polymer concentration and determining the molar mass are conducted sequentially.

22. (canceled)

23. (original) The method of claim 1, wherein the total analysis time is not greater than about 3 minutes per sample.

24. (original) The method of claim 1, wherein the total analysis time is not greater than about 1 minute per sample.

25. (original) The method of claim 1, wherein the total analysis time is not greater than about 40 seconds per sample.

26. (original) The method of claim 1, wherein the average molecular weight is a weight average molecular weight.

27. (original) The method of claim 1, wherein the average molecular weight is a number average molecular weight.

28. (previously presented) A method for the determination of polymer molecular weight, comprising:

providing a sample array comprising a plurality of spatially differentiated sites, each site comprising a polymer resin reaction product of a dipehnyl carbonate and bisphenol A;

preparing an analytical sample for each spatially differentiated site by dissolving the polymer resin reaction product in a suitable solvent;

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injecting a known amount of the analytical sample into a flow analysis system comprising an on-line flow path of sequential chromatographic column, a concentration detector, and a waste reservoir, and a split flow path of the concentration detector, a molar mass detector and the waste reservoir;

effecting a minimally dispersive separation of the analytical sample with the chromatographic column to yield a high molecular weight fraction comprising polycarbonate oligomers and polymers comprising at least two bisphenol A units, said fraction being substantially free of monomers;

determining a polymer concentration in the high molecular weight fraction of the analytical sample using the concentration detector;

diverting a portion of the analytical sample to the split flow path of the molar mass detector and disposing the remainder of the analytical sample to the waste reservoir without further processing; and determining the molar mass in the high molecular weight fraction of the diverted portion of the analytical sample using the molar mass detector; and

deriving an average molecular weight for the analytical sample based on the polymer concentration and the molar mass.

29. (previously presented) The method of claim 28, wherein preparing an analytical sample for each spatially differentiated site, injecting a known amount of the analytical sample, effecting a minimally dispersive separation of the analytical sample, determining the polymer concentration in the high molecular weight fraction of the analytical sample, determining the molar mass in the high molecular weight fraction of the analytical sample, and deriving an average molecular weight for the analytical sample are conducted without human intervention.

30. (canceled)

31. (canceled)

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32. (canceled)

33. (canceled)

34. (canceled)

35. (canceled)

36. (canceled)

37. (canceled)

38. (previously presented) The method of claim 28, wherein the minimally dispersive separation yields a high molecular weight fraction having a baseline peak width less than about 30 seconds.

39. (previously presented) The method of claim 28, wherein the minimally dispersive separation yields a high molecular weight fraction having a baseline peak width less than about 20 seconds.

40. (previously presented) The method of claim 28, wherein the minimally dispersive separation yields a high molecular weight fraction having a baseline peak width less than about 10 seconds.

41. (previously presented) The method of claim 28, wherein the minimally dispersive separation yields a high molecular weight fraction having a peak width at half height less than about 10 seconds.

42. (previously presented) The method of claim 28, wherein the minimally dispersive separation yields a high molecular weight fraction having a peak width at half height less than about 5 seconds.

43. (previously presented) The method of claim 28, wherein the minimally dispersive separation yields a high molecular weight fraction having a peak width at half height less than about 3 seconds.

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44. (previously presented) The method of claim 1, wherein the diverted high molecular weight fraction comprises high molecular weight fraction polycarbonate oligomers and polymers comprising at least two bisphenol A units.

45. (previously presented) The method of claim 28, wherein the diverted high molecular weight fraction comprises high molecular weight fraction polycarbonate oligomers and polymers comprising at least two bisphenol A units.

46. (previously presented) The method of claim 1, comprising effecting rapid mixing of the diverted high molecular weight fraction prior to determining the molar mass off-line.

47. (previously presented) The method of claim 28, comprising effecting rapid mixing of the diverted high molecular weight fraction prior to determining the molar mass off-line.